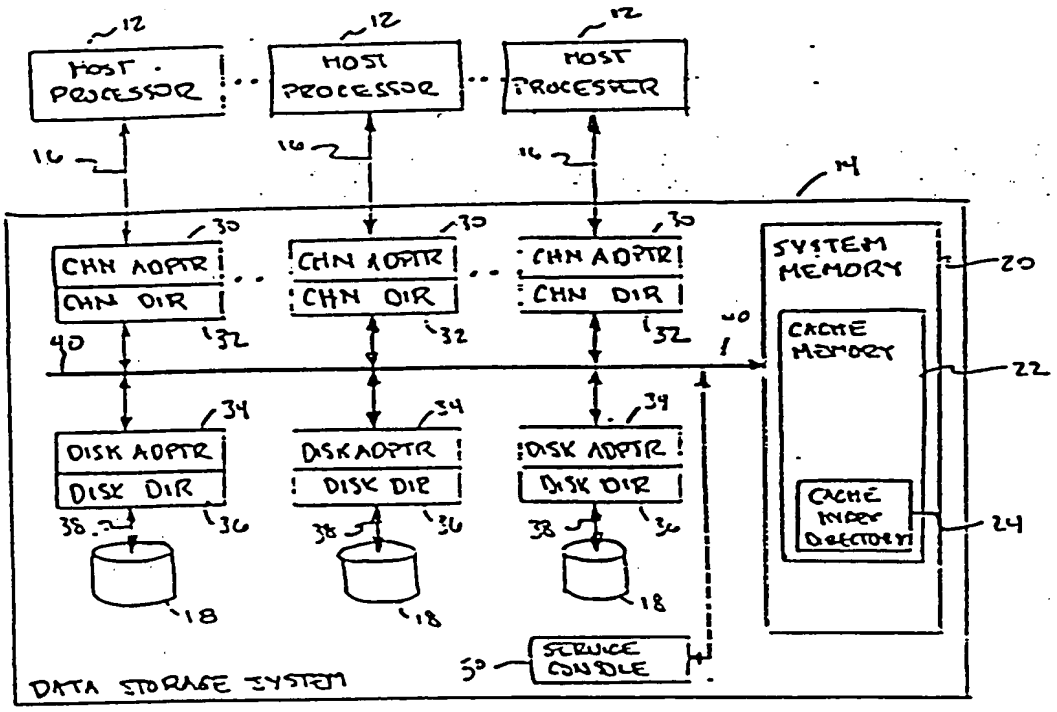

FIG. 2

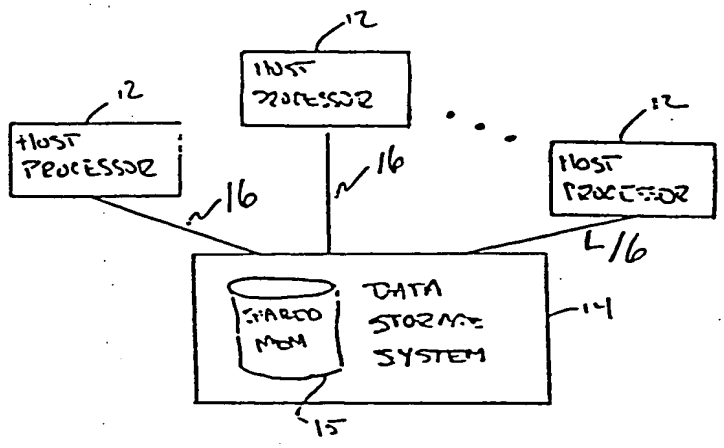

FIG. 1

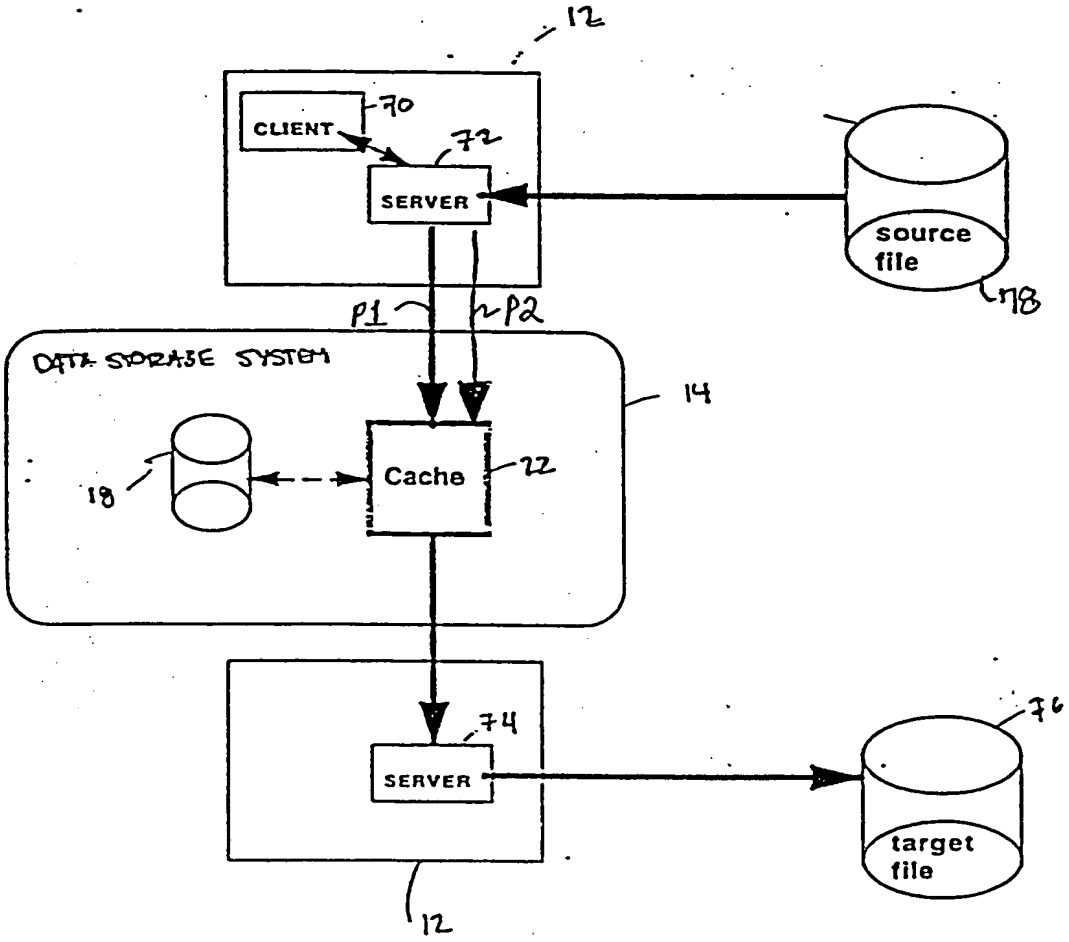
12
CLIENT
70
72
SERVER
source file
78
P1
P2
DATA STORAGE SYSTEM
14
18
Cache
22
74
SERVER
76
target file
12

FIG. 3

Field Name	Field Usage
blk5_id	Block identifier, set to "MAS_EMC" on master device. Copies are also written to secondary devices with id set to "SEC_EMC"
blk5_dev_id	Entry number of master device in device table
blk5_seg_size	Size of transfer segment in blocks
blk5_version	Master Control Block structure version number
blk5_time_id	Creation time of master block
blk5_tot_seg_num	Total number of transfer segments
blk5_process_id_table_ptr	Pointer to start of process id table structure
blk5_secondary_device_entrynum	Number of entries in secondary device table
blk5_start_process_segment_ptr	Pointer to process segment pointer table structures
blk5_max_connections	Maximum number of connections allowed
blk5_mast_sec_start_ptr	Pointer to process segment pointer table structures
blk5_mast_sec_start_setment_ptr	Pointer to start of data segments
blk5_ptr_seg_per_process	Number of segments per process (connection)
blk5_maxptr	Maximum number of segments per process
blk5_unix_filename	UNIX file name of master device

FIG. 4

Field Name	Field Usage
pro-process-id	Process (connection)id(=slot number)
pro_flag_process	Process flag field
pro_con_rc	Status code
pro_requestor	Name of requestor (initiator) process
pro_requestor_password	Password for requestor process
pro_requestor_type	OS Type of requestor
pro_requestee	Name of requestee (connector) process
pro_requestee_type	OS Type of requestee
pro_dtd	Command structure for initiator to connector comm.
InitM	Command structure for connector to initiator comm.

FIG. 5

Field Name	Field Usage
sec_dev_id	Device id (from configuration file)
sec_str_seg_ptr	Pointer to start of data segments for the device
sec_seg_number_for_device	Number of data segments on the device
sec_start_segment_number	Segment number of first segment on device (with the first segment on the first device being segment number 1)

FIG. 6

Field Name	Field Usage
ptr_process_segment_ptr	Starting block of data segment on disk
ptr_process_segment_flg	Segment status flag
ptr_process_block_seq	Segment sequence number
ptr_process_req_id	Process request sequence number
ptr_process_blk_read	Size of segment in blocks

FIG. 7

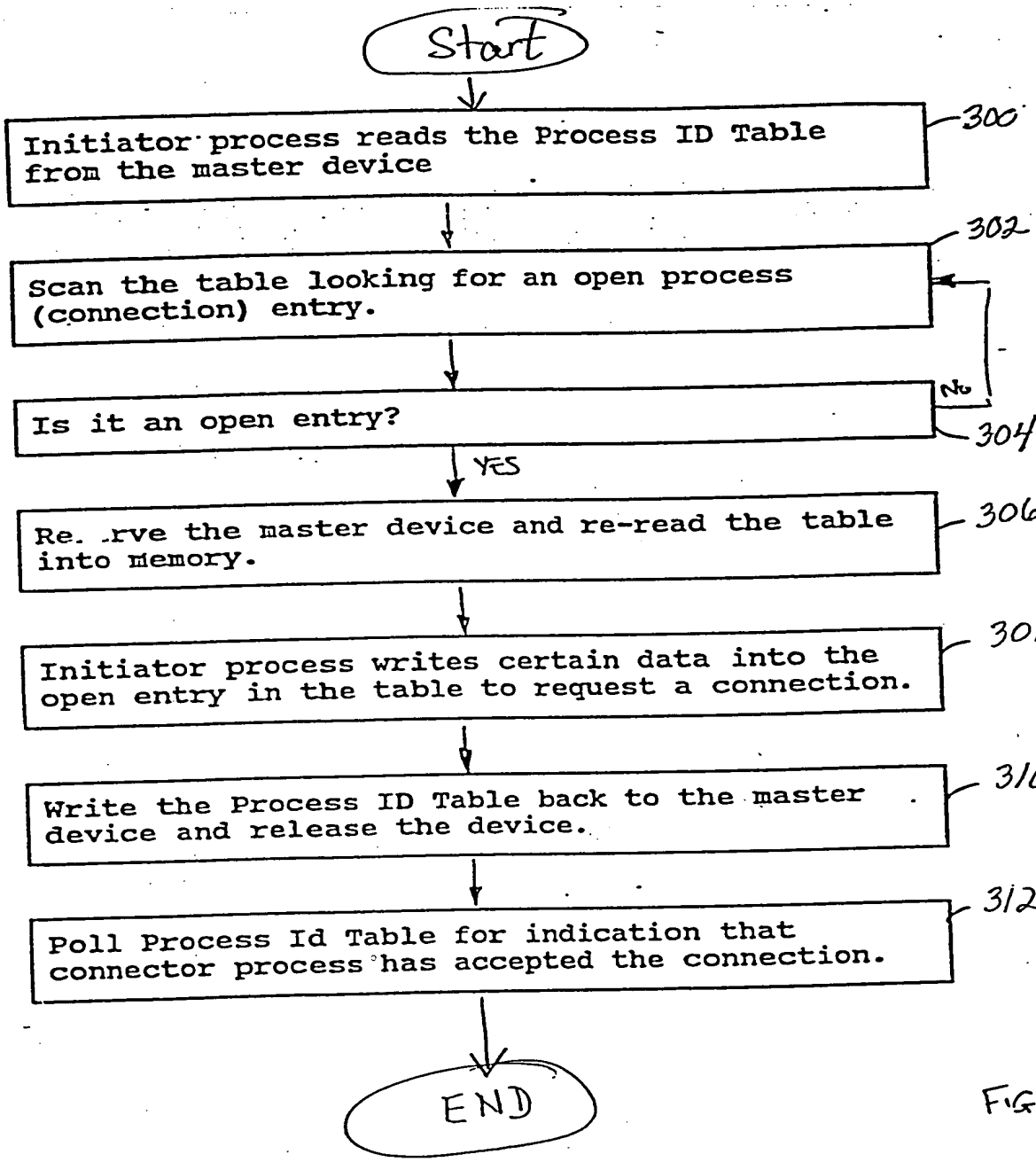
Start
Initiator process reads the Process ID Table from the master device
300
Scan the table looking for an open process (connection) entry.
302
Is it an open entry?
No
304
YES
Re. rve the master device and re-read the table into memory.
306
Initiator process writes certain data into the open entry in the table to request a connection.
308
Write the Process ID Table back to the master device and release the device.
310
Poll Process Id Table for indication that connector process has accepted the connection.
312
END

FIG 8

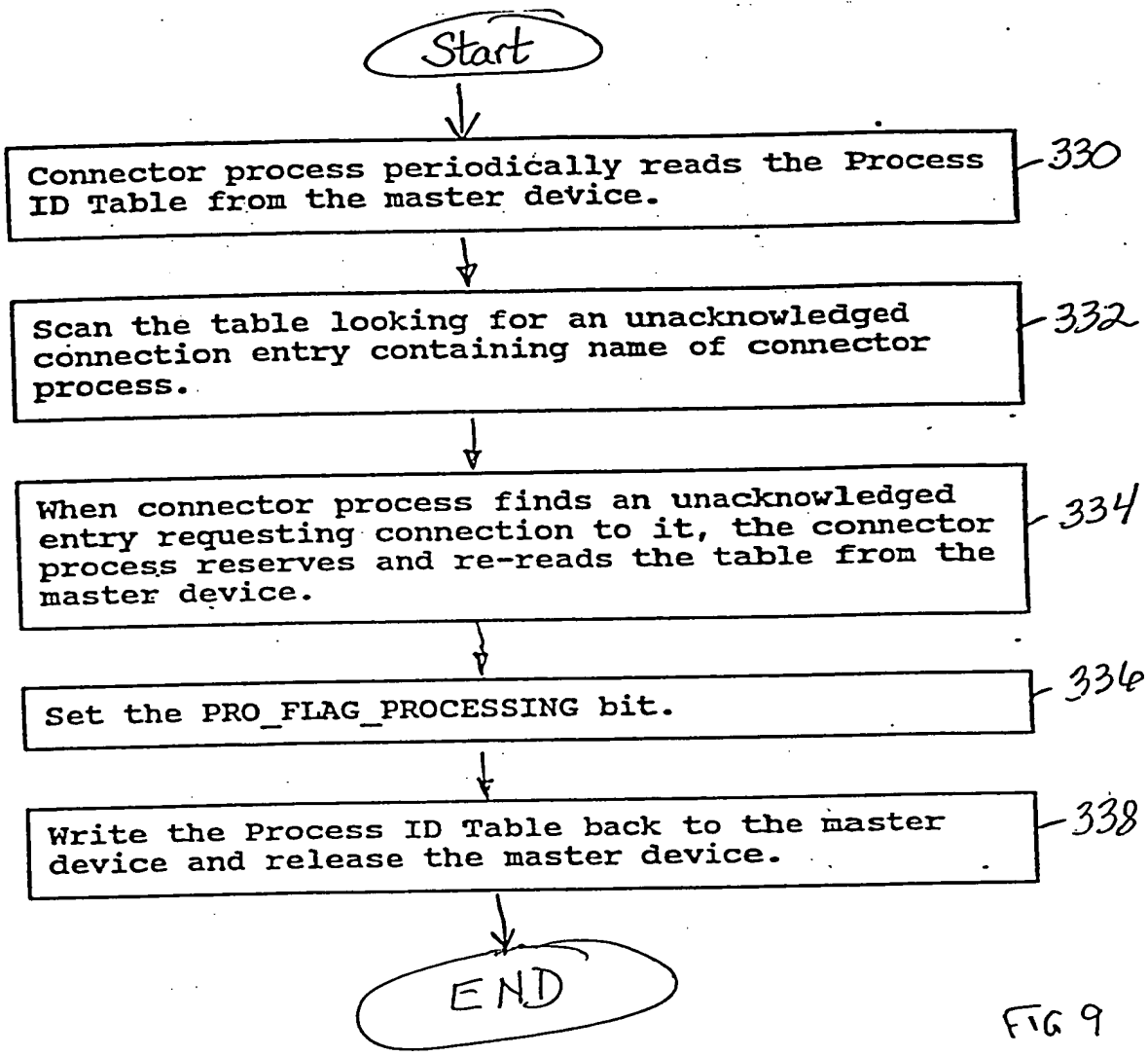
Start
Connector process periodically reads the Process ID Table from the master device.
330
Scan the table looking for an unacknowledged connection entry containing name of connector process.
332
When connector process finds an unacknowledged entry requesting connection to it, the connector process reserves and re-reads the table from the master device.
334
Set the PRO_FLAG_PROCESSING bit.
336
Write the Process ID Table back to the master device and release the master device.
338
END

FIG 9

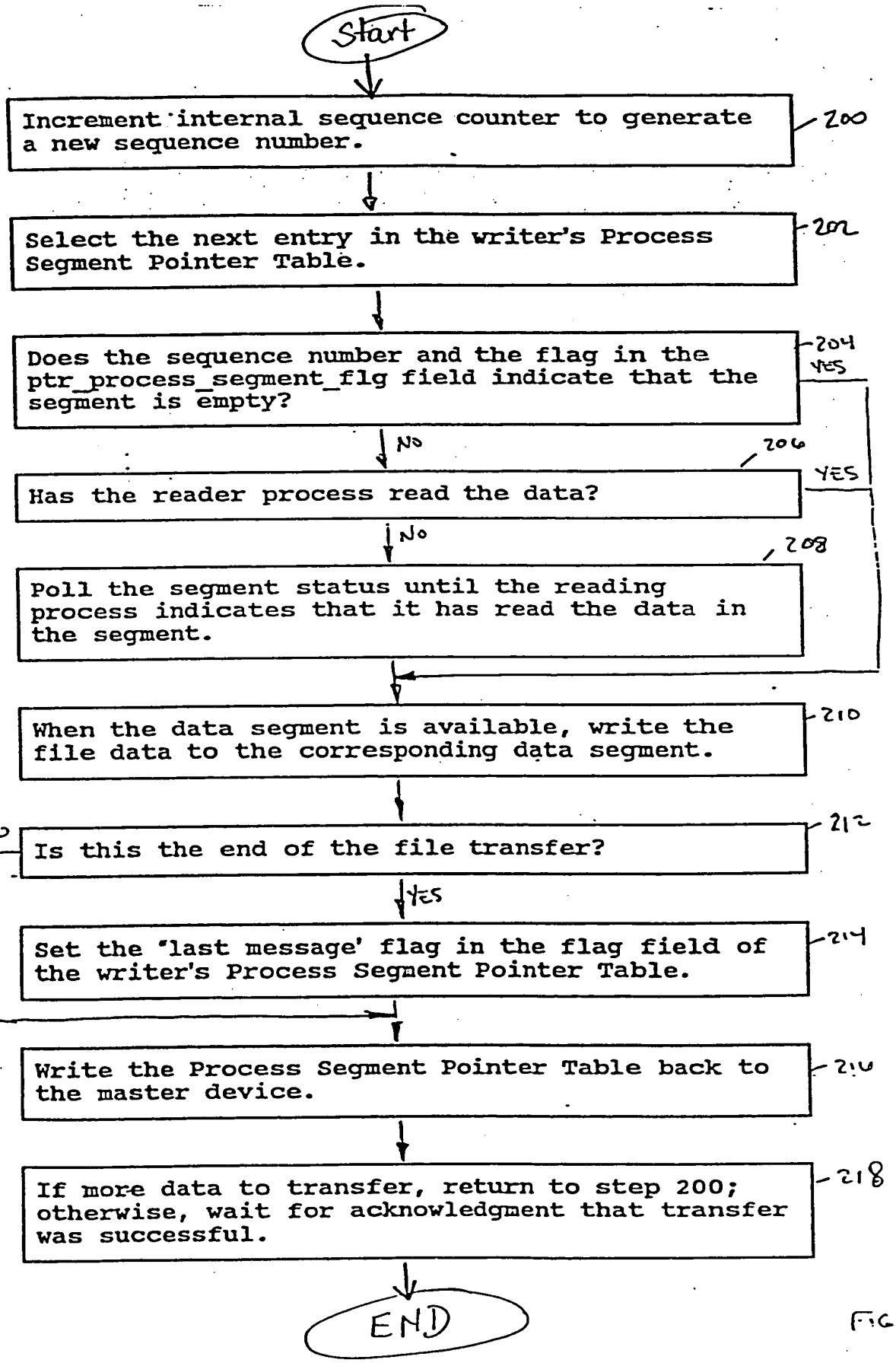
Start
Increment internal sequence counter to generate a new sequence number.
200
Select the next entry in the writer's Process Segment Pointer Table.
202
Does the sequence number and the flag in the ptr_process_segment_flg field indicate that the segment is empty?
204
YES
No
206
Has the reader process read the data?
YES
No
208
Poll the segment status until the reading process indicates that it has read the data in the segment.
When the data segment is available, write the file data to the corresponding data segment.
210
No
Is this the end of the file transfer?
212
YES
Set the 'last message' flag in the flag field of the writer's Process Segment Pointer Table.
214
Write the Process Segment Pointer Table back to the master device.
216
If more data to transfer, return to step 200; otherwise, wait for acknowledgment that transfer was successful.
218
END

FIG. 10

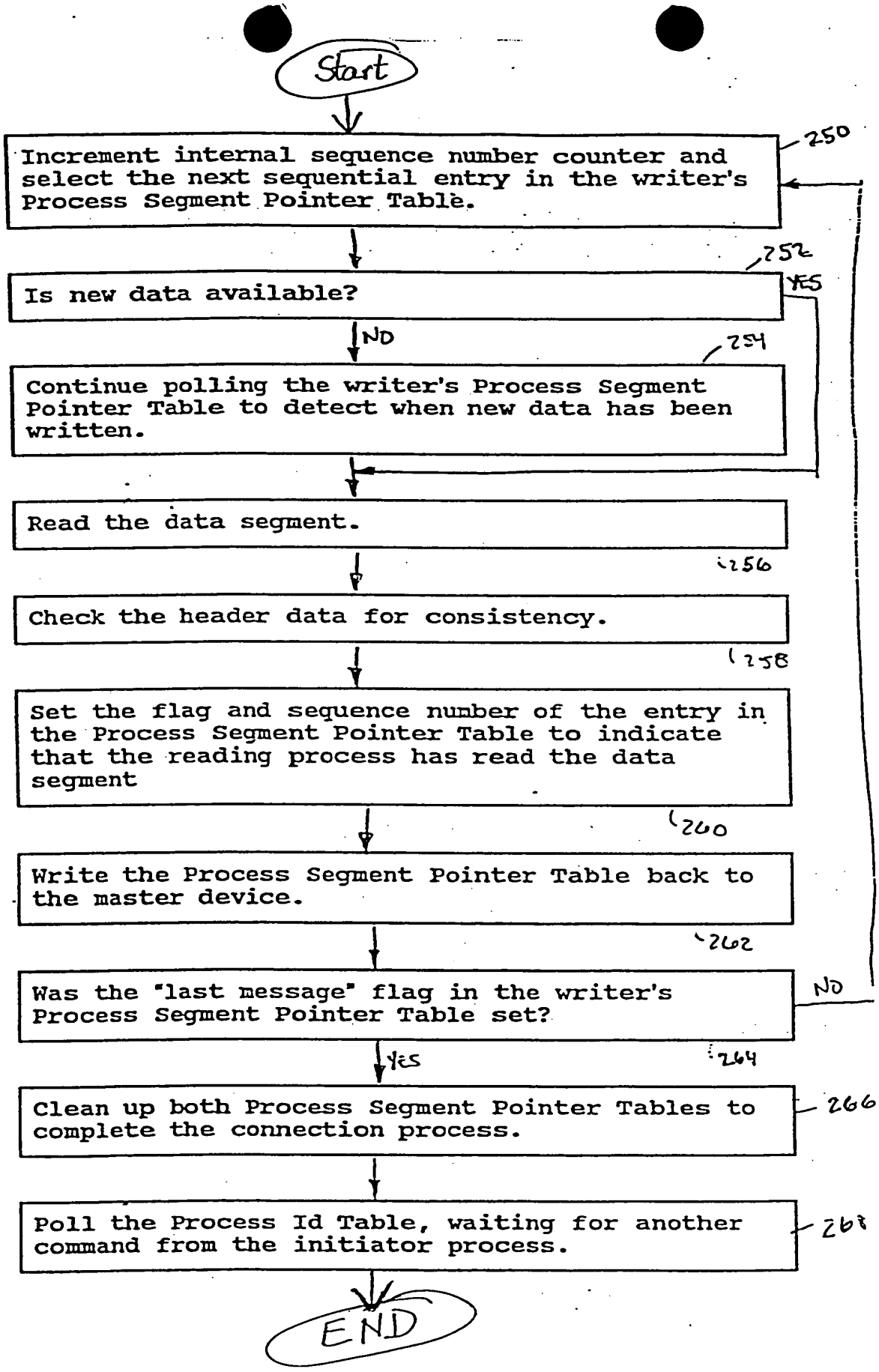
Start
Increment internal sequence number counter and select the next sequential entry in the writer's Process Segment Pointer Table.
250
Is new data available?
252
YES
NO
Continue polling the writer's Process Segment Pointer Table to detect when new data has been written.
254
Read the data segment.
256
Check the header data for consistency.
258
Set the flag and sequence number of the entry in the Process Segment Pointer Table to indicate that the reading process has read the data segment
260
Write the Process Segment Pointer Table back to the master device.
262
Was the "last message" flag in the writer's Process Segment Pointer Table set?
NO
YES
264
Clean up both Process Segment Pointer Tables to complete the connection process.
266
Poll the Process Id Table, waiting for another command from the initiator process.
268
END

FIG 11

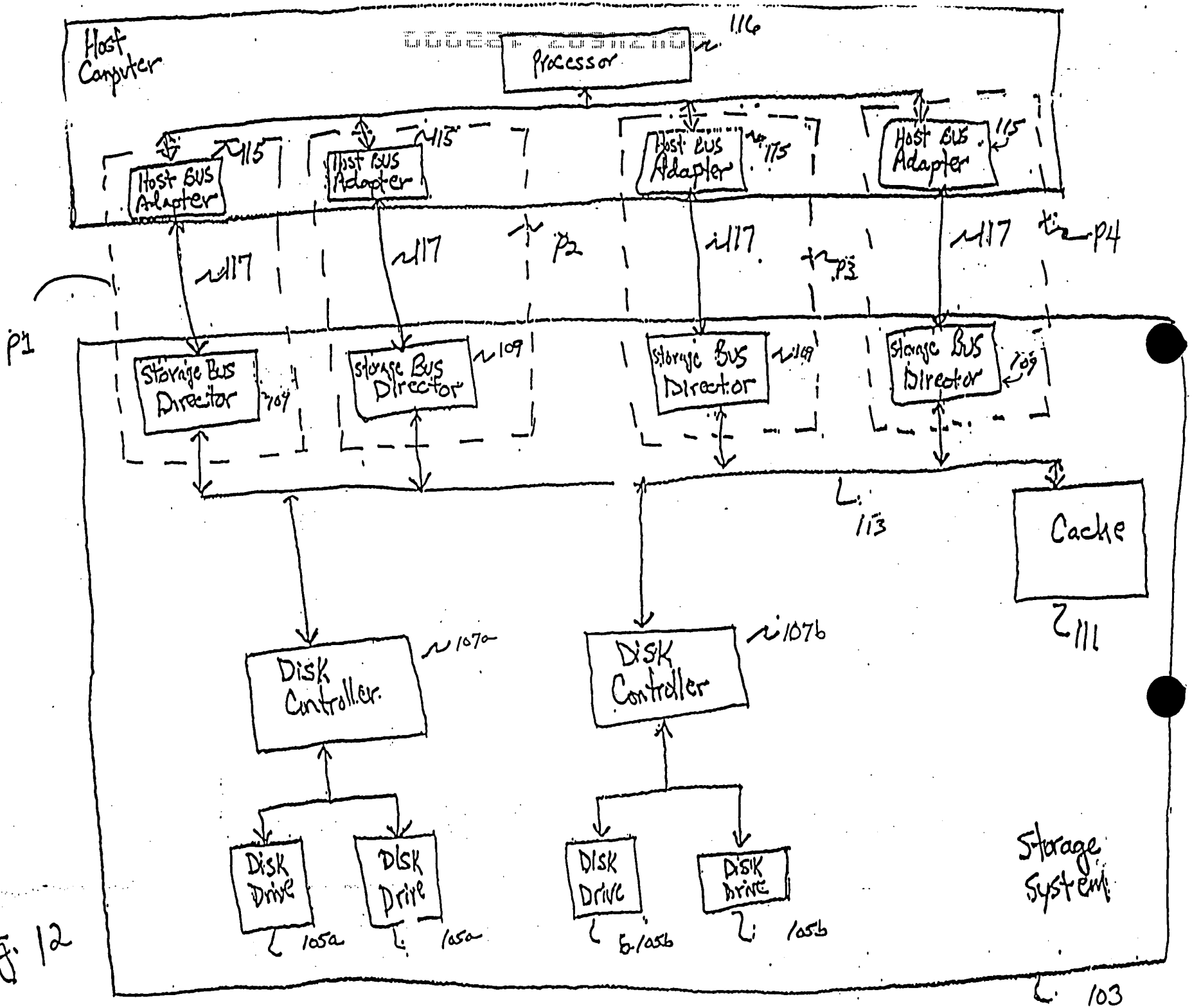
Host Computer
Processor
116
Host Bus Adapter
115
Host Bus Adapter
115
Host Bus Adapter
115
Host Bus Adapter
115
117
117
117
117
P1
P2
P3
P4
Storage Bus Director
109
Storage Bus Director
109
Storage Bus Director
109
Storage Bus Director
109
113
Cache
111
Disk Controller
107a
Disk Controller
107b
Disk Drive
Disk Drive
Disk Drive
Disk Drive
105a
105a
105b
105b
Storage System
103

Fig. 12

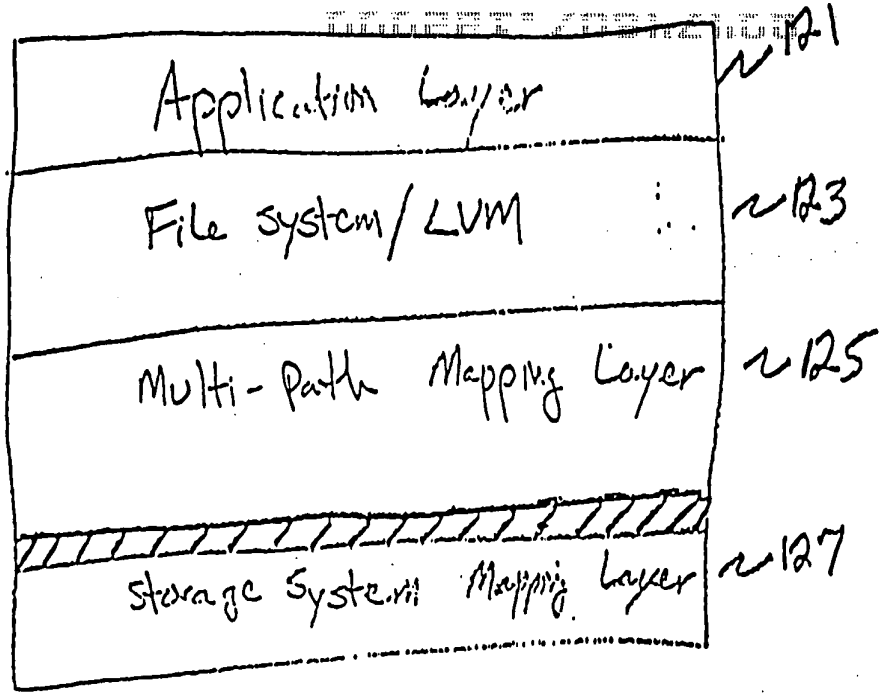
Application Layer
121
File system / LVM
123
Multi-Path Mapping Layer
125
Storage System Mapping Layer
127

Fig. 13

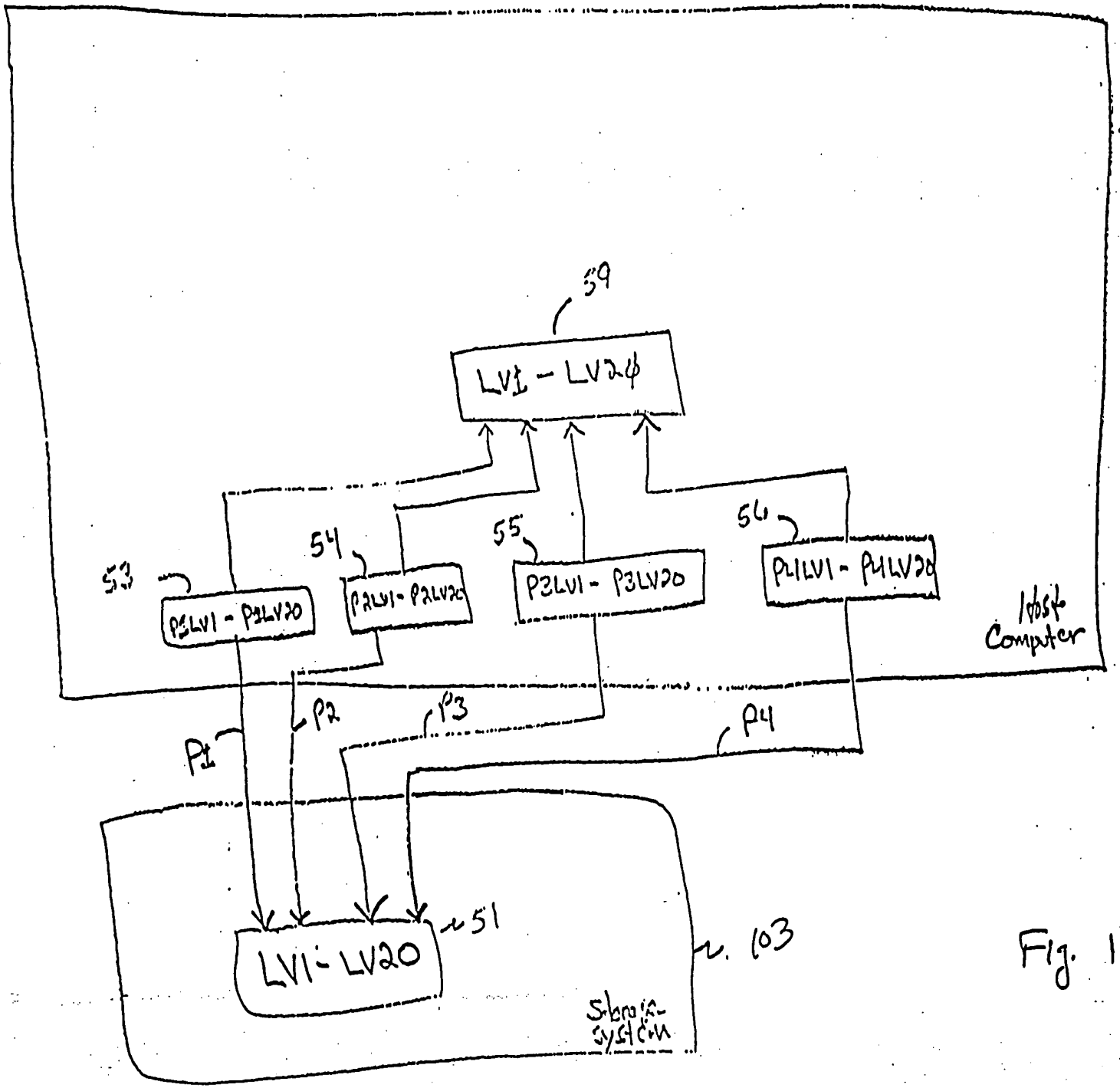
101
59
LV1 - LV24
53
54
55
56
P1LV1 - P1LV20
P2LV1 - P2LV20
P3LV1 - P3LV20
P4LV1 - P4LV20
Host Computer
P1
P2
P3
P4
51
LV1 - LV20
103
Storage System

Fig. 14

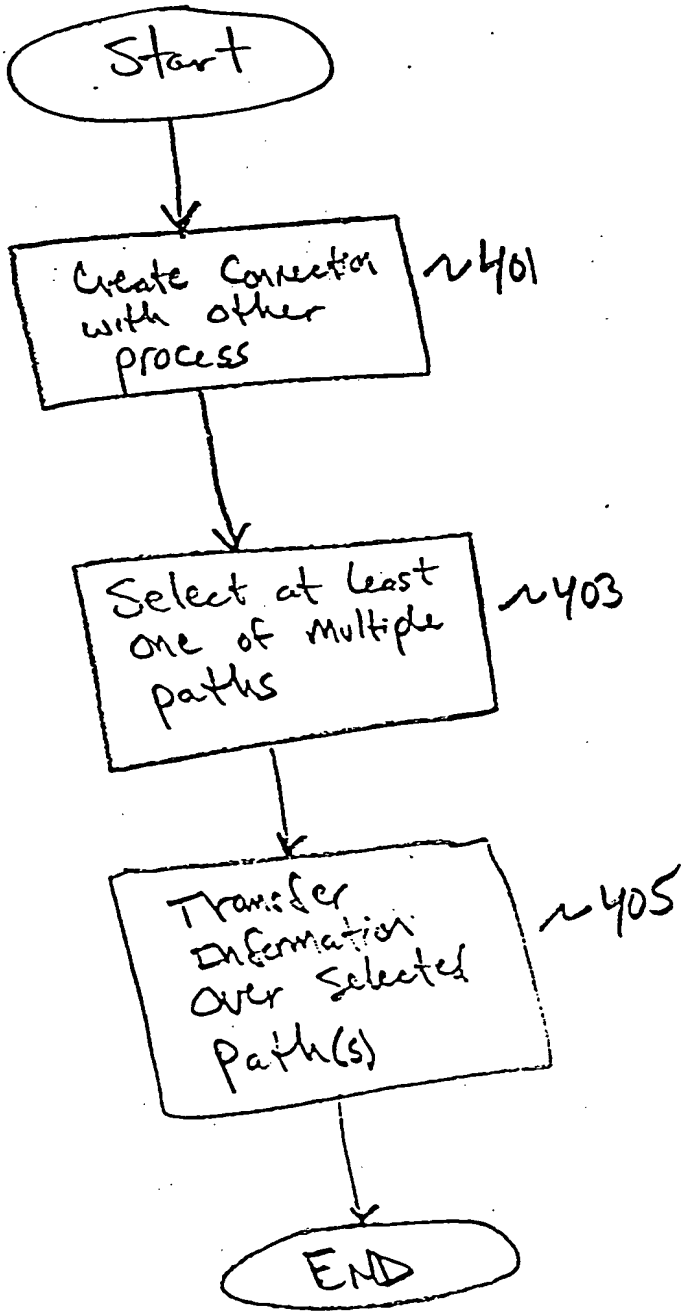
Start
Create Connection with other process
401
Select at least one of multiple paths
403
Transfer Information over selected path(s)
405
END

Fig 15